PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of:		
John L. BOWERS		
Application No. (not yet assigned)	Parent Application Art Unit:	3753
Filed: 6 November 2001	Parent Application Examiner:	J. Rivell
For: UNI-DIRECTIONAL FLUID VALVE	Attorney Docket:	***P64258US2***

PRELIMINARY AMENDMENT

Box REISSUE
Assistant Commissioner for Patents
Washington, D.C. 20231

Sir:

Prior to examination, Applicant submits the following Amendment.

It is not believed that fees for net addition of claims are required, beyond those that may otherwise be provided for in documents accompanying this paper. However, in the event that any fees are required for consideration of this paper and any papers associated with it (including fees for net addition of claims) are hereby authorized to be charged to our Deposit Account No. 06-1358.

KINDLY ENTER THE FOLLOWING AMENDMENT:

IN THE SPECIFICATION

Column 1, prior to the "BACKGROUND OF THE INVENTION", please insert the following lines:

-- CROSS-REFERENCE TO RELATED APPLICATIONS

-- This application is a continuation of reissue application Serial No. 09/442,082, filed November 15, 1999. --

IN THE CLAIMS

Please cancel claims 1-15 without prejudice or disclaimer.

Please add the following new claims:

16. An exhalation permitting filter mask assembly for positioning over the mouth and nose of a user, the filter mask assembly comprising:

a mask configured to fit over the nose and mouth of a user and including filter material through which air can be inhaled by a user while effecting filtration of the inhaled air;

a uni-directional valve mounted to the mask for permitting exhalation through the valve while precluding inhalation through the valve;

the valve including a flexible flap having a root end portion, opposite side portions and a free end portion, an upper housing member, an inlet port and a valve seat surrounding the inlet port and being part of the upper housing member and including a sealing surface adjacent the inlet port;

the flexible flap being fixedly mounted at the root end relative to the upper housing member in a manner so that the free end portion makes sealing contact with the sealing surface when the flexible flap is closed and so that the free end portion of the flexible flap lifts from contact with the sealing surface and moves outwardly of the sealing surface when exhaled air passes through the inlet port; and

the flexible flap having a transverse curvature extending medially of the flap imparting sufficient stiffening to the flexible flap to maintain the flexible flap in sealing contact with the sealing surface for any orientation of the filter mask during normal operating conditions in the absence of a pressure differential across the flexible flap.

17. A filter mask assembly as recited in claim 16, wherein the flexible flap is formed of elastomeric material.

18. A filter mask assembly as recited in claim 16, wherein the upper housing member includes a curved surface and the transverse curvature is imparted to the flexible flap by virtue of the root end of the flexible flap being held against the curved surface of the upper housing member.

19. A filter mask assembly as recited in claim 16, additionally including a lower housing member facing the upper housing member wherein the root end of the flexible flap is trapped and fixedly positioned between facing surfaces of the upper housing member and the lower housing member.

20. A filter mask assembly as recited in claim 19, wherein the facing surface of the lower housing member is a curved surface.

21. A filter mask assembly as recited in claim 19, wherein that part of the sealing surface of the valve seat which the free end of the flexible flap contacts is a flat surface.

22. A filter mask assembly as recited in claim 19, wherein the sealing surface is provided on a portion of a seal ridge surrounding the inlet port.

23. A filter mask assembly as recited in claim 22, wherein the seal ridge comprises four linear seal ridge members and the facing surface on the lower housing is provided on a profiled block aligned with one of the linear seal ridge members.

24. A filter mask assembly as recited in claim 23, additionally including a second profiled block provided in the lower housing member engaging a central portion of the flexible flap outwardly of the root end to urge the central portion toward the upper housing to enhance the transverse curvature of the flexible flap.

25. A filter mask as recited in claim 16, wherein the filter material comprises at least one sheet incorporating filter material.

26. A filter mask assembly including:

a mask body adapted to fit over the nose and mouth of a wearer;

an exhalation valve positioned in an aperture in the mask body and extending through the mask body;

the exhalation valve including a flexible flap having a root end portion and a free end portion and a valve seat;

the flexible flap being mounted in the valve at its root end portion adjacent the valve seat in a manner so that the flexible flap has a free end engaging the valve seat when closed; and

wherein the flexible flap has a transverse curvature which effects maintenance of the flexible flap in sealing contact with the valve seat for any orientation of the filter mask

assembly during usage in the absence of an opening exhalation caused pressure differential across the flexible flap.

27. The filter mask assembly as recited in claim 26, wherein the transverse curvature of the flexible flap progressively decreases toward its free end.

28. The filter mask of claim 27, wherein the exhalation valve additionally includes a lower housing member and the root end portion of the flexible flap is caused to contact the valve seat by a portion of the lower housing member.

29. The filter mask of claim 26, wherein the exhalation valve is located on the mask in a position so that during normal head movements of a wearer, the free end portion of the flexible flap is generally directed downwardly.

30. The filter mask of claim 26, wherein the mask body includes at least one sheet of filter material.

31. An exhalation permitting filter mask assembly including:

a cup-shaped mask body formed of material including filter material and having an inner surface and an outer surface configured to fit over the nose and mouth of a user with the inner surface facing the user to define a breathing space;

a one-way valve mounted to the mask for permitting only exhalation from the breathing space and including a first housing, an inlet port, and a valve seat in the first housing, a flexible flap engaging the valve seat;

wherein the flexible flap has both a fixedly positioned root end portion held in fixed position on the housing and a moveable free end;

wherein a portion of the valve seat has a curved sealing surface that contacts the flap at the root end and an outer sealing surface portion engaged by the free end of the flexible flap to preclude inhalation through the one-way valve; and

a second housing including a profiled block having a curved surface which mates with the curved sealing surface of the valve seat and contacts the flexible flap at its root end so that the root end is clamped between the curved surface of the profiled block and the curved sealing surface of the valve seat to impart transverse curvature to the flexible flap at the root end; and

wherein the transverse curvature causes the free end of the flexible flap to be pressed into contact with the outer sealing surface for any orientation of the valve in the absence of an opening exhalation pressure differential across the flap; and

wherein, when an opening exhalation pressure differential is created across the flap, the free end of the flexible flap flexes away from the outer sealing surfaces to permit exhalation through the valve.

32. A filter mask as recited in claim 31, wherein one of the housings includes lateral protrusions which extend into the other of the housings for effecting proper alignment of the first and second housings.

33. A filter mask as recited in claim 32, wherein one of the housings includes openings each matingly receiving a portion of one of the lateral protrusions of the other of the housings.

34. A filter mask as recited in claim 32, wherein the flexible flap includes a notch in an edge and one of the housings includes a positioning block extending into the notch for effecting proper positioning of the flexible flap.

35. A filter mask as recited in claim 31, wherein the filter material is in the form of at least one sheet incorporating filter material.

36. A filter mask assembly including:

a mask body adapted to fit over the nose and mouth of a wearer;

an exhalation valve positioned in an aperture in the mask body and extending through the mask body;

the exhalation valve including a flexible flap having a root end portion and a free end portion and a valve seat;

the flexible flap being mounted in the valve inwardly of the rearmost extent of its root end portion adjacent the valve seat; and

wherein the flexible flap has a transverse curvature which effects maintenance of the flexible flap in sealing contact with the valve seat for any orientation of the filter mask assembly in the absence of an opening exhalation caused pressure differential across the flexible flap.

37. An exhalation permitting filter mask adapted to be worn over the nose and mouth of a user and made from or incorporating a filter material to remove one or more unwanted components from inhaled air, the mask further including:

a uni-directional valve mounted in the mask for permitting exhalation through the valve while precluding inhalation through the valve;

the valve including a flexible flap having a transversely extending root end portion and a transversely extending free end portion;

an upper housing member, an inlet port and a valve seat surrounding the inlet port and being part of the upper housing member and including a sealing surface adjacent the inlet port;

the flexible flap being fixedly mounted at the root end portion relative to the upper housing member so that the flexible flap makes contact with the sealing surface when the

flexible flap is closed and so that the free end portion of the flexible flap lifts from contact with the sealing surface and moves outwardly of the sealing surface in response to exhalation by the user so that exhaled air passes through the inlet port; and

the flexible flap having a transverse curvature extending outwardly from the root end portion imparting sufficient stiffening to the flexible flap to maintain the flexible flap in sealing contact with the sealing surface for any orientation of the filter mask in the absence of an exhalation pressure differential across the flexible flap.

38. A filter mask assembly as recited in claim 37, wherein the flexible flap is formed of elastomeric material.

39. The filter mask assembly as recited in claim 38, wherein the transverse curvature of the flexible flap progressively decreases with increase in distance from the inner end portion of the flexible flap.

40. An exhalation permitting filter mask assembly including:

a mask body formed of material including filter material with the mask body having an inner surface and an outer surface and being configured to fit over the nose and mouth of a user with the inner surface facing the user to define a breathing space;

a one-way valve mounted in the mask body for permitting only exhalation from the breathing space and including an upper housing and a lower housing, a seal ridge defining a valve seat and at least one inlet port in the upper housing surrounded by the seal ridge;

a flexible flap positioned between the upper housing and the lower housing to contact the seal ridge and preclude inhalation through at least one inlet port engaging the valve seat;

wherein the flexible flap has a longitudinal axis and a fixedly positioned root end portion held in fixed position relative to the upper housing and the lower housing and a moveable free end portion and wherein the flexible flap is fixedly positioned so that its root end portion engages the seal ridge and the lower housing in a manner imparting transverse curvature to the flexible flap at the root end portion, and so that the transverse curvature causes the free end of the flexible flap to be pressed into contact with the seal ridge in any orientation of the valve in the absence of an opening exhalation pressure differential across the flap; and

wherein, when an opening exhalation pressure differential is created across the flexible flap, the free end portion of the flexible flap flexes away from the real ridge allowing exhalation through the valve.

41. A filter face mask comprising:

a mask body adapted to fit over a nose and a mouth of a wearer; and

an exhalation valve mounted to the mask body;

the exhalation valve comprising a flexible flap and a valve seat;

the flexible flap being mounted to the valve seat in cantilever fashion for movement between open and closed positions;

the flexible flap having a longitudinal dimension and a free end that rests upon the valve seat when in closed position;

the flexible flap also having a transverse curvature in a direction transverse to the flap's longitudinal dimension;

the transverse curvature biasing the flexible flap to effect positioning and retention of the flexible flap in the closed position in the absence of an opening pressure differential across the flap for any orientation of the valve.

42. The filter mask of claim 41, wherein the flexible flap has maximum transverse curvature at the the location where the flexible flap is mounted to the valve seat.

43. The filter mask of claim 42, wherein the transverse curvature of the flexible flap progressively decreases toward the free end of the flexible flap.

44. The filter mask of claim 41, wherein the transverse curvature is imparted to the flexible flap by virtue of its mounting to the valve seat.

45. The filter mask of claim 44, wherein the flexible flap is mounted to the valve seat by being pressed towards the seat by a member disposed on a valve cover.

46. The filter mask of claim 41, wherein the exhalation valve is so located on the mask such that during normal head movements of a wearer, the free end of the flexible flap is generally directed downwardly.

47. A filter face mask that comprises:

a mask body adapted to fit over a nose and mouth of a wearer for filtering inhalation air; and

an exhalation valve mounted to the mask body, the exhalation valve including a flexible flap, an upper housing including a seal ridge terminating in a seal surface, and a lower housing;

the upper housing including one or more inlet ports, the one or more inlet ports being surrounded by the seal ridge;

the lower housing including one or more outlet ports and being joined to the upper housing;

the flexible flap having a stationary portion and a free portion and a peripheral edge that includes both stationary and free segments;

the stationary portion of the flexible flap being held in a fixed position relative to and in contact with a portion of the seal ridge so as to remain stationary during exhalation, and the free portion of the flap being movable during exhalation; and

the flexible flap having a transverse curvature that is imparted to the flexible flap by the mounting of the flexible flap in contact with a portion of the seal ridge; the transverse curvature effecting biasing of the free portion of the flexible flap towards the seal surface under neutral conditions while also allowing the free portion of the flexible flap to be lifted from the seal surface during an exhalation.

48. The filter face mask of claim 47, wherein the mounting of the flexible flap causes at least a portion of the stationary portion of the flexible flap to reside beneath the seal surface means of the valve seat when the valve is viewed from a side elevation.

49. The filter face mask of claim 48, wherein the flexible flap is mounted to the valve in cantilever manner by being trapped between respective surfaces on the valve seat and the valve cover.

50. The filter face mask of claim 47, wherein the outlet ports are oriented on the valve cover relative to the flexing of the flexible flap such that exhaled air from a wearer exits the

exhalation valve with a downward component that directs the exhalate away from a wearer's eyes.

51. The filter face mask of claim 47, wherein the seal surface has multiple portions that include first and second side portions and a free-end portion, the free segment of the peripheral edge of the flexible flap having a flat configuration above the first and second side portions and the free end portion.

52. The filter face mask of claim 47, wherein the flexible flap's transverse curvature progressively decreases towards an outer end of the free portion of the flexible flap.

53. The filter face mask of claim 47, wherein the valve seat and valve cover are inter-fitting plastic parts.

54. The filter face mask of claim 47, wherein said stationary portion of the flexible flap is permanently configured for embracing a portion of the valve seat.

55. A uni-directional fluid valve that comprises:

(a) a flexible flap; and

(b) a cooperating valve seat, the valve seat including a seal surface that surrounds an orifice, the flexible flap being attached to the valve seat in a cantilevered fashion such that the flexible flap makes contact with the seal surface when the flexible flap is closed and such that a free end of the flexible flap lifts from the seal surface when fluid passes through the orifice in the permitted direction, the flexible flap having a transverse curvature to bias the

flexible flap to the seal surface in the absence of a pressure differential across the flexible flap, under any orientation of the valve.

56. The valve of claim 55, wherein the flexible flap exhibits the curvature in its natural state.

57. The valve of claim 55, wherein the curvature is imparted to the flexible flap by virtue of its mounting to the valve seat.

58. The valve of claim 57, wherein the flexible flap is trapped at a fixed portion of the flexible flap between confronting surfaces of the valve seat and a valve cover.

59. The valve of claim 58, wherein the confronting surfaces are curved.

60. The valve of claim 55, wherein that part of the seal surface which the free end of the flexible flap is adapted to contact is flat.

61. The valve of claim 55, wherein the flexible flap includes side edges adapted to contact the seal surface and wherein those parts of the seal surface which the side edges of the flexible flap are adapted to contact are flat.

62. The valve of claim 55, wherein the mounting of the flexible flap on the valve seat also imparts a longitudinal curvature to the central section of the flexible flap.

63. A filter mask that has an exhalation valve, constructed in accordance with claim 51 mounted to the mask.

64. A filter face mask that comprises:

(a) a mask body adapted to fit over a nose and a mouth of a wearer; and

(b) an exhalation valve mounted to the mask body, the exhalation valve comprising a flexible flap and a valve seat, the flexible flap being mounted to the valve seat in cantilever fashion such that it has a longitudinal dimension, the flexible flap having a free end that rests upon the valve seat when closed, the flexible flap exhibits a curvature in a direction transverse to the flexible flap's longitudinal dimension, the transverse curvature biasing the flexible flap to assist in closing the valve in the absence of an opening pressure differential across the flexible flap, under any orientation of the valve.

65. The filter mask of claim 64, wherein the flexible flap has a transverse curvature at the location where the flexible flap is mounted to the valve seat.

66. The fluid valve of claim 55, wherein the transverse curvature of the flexible flap decreases in the longitudinal dimension toward a free end of the flexible flap.

67. The filter mask of claim 64, wherein the transverse curvature is imparted to the flexible flap by virtue of its mounting to the valve seat.

68. The filter mask of claim 67, wherein the flexible flap is mounted to the valve seat by being pressed toward the valve seat by a member disposed on a valve cover.

69. The filter mask of claim 64, wherein the exhalation valve is so located on the mask such that during normal head movements of a wearer, the free end of the flexible flap is generally directed downward.

70. A filter face mask that comprises:

(a) a mask body adapted to fit over a nose and mouth of a wearer; and

(b) an exhalation valve mounted to the mask body, the exhalation valve comprising a flexible flap, a valve seat, and a valve cover, the valve seat comprising one or more inlet ports, which one or more ports are surrounded by a seal surface, the valve cover comprising one or more outlet ports and being joined to the valve seat, the flexible flap having a stationary portion and a free portion and a peripheral edge that includes stationary and free segments, the stationary segment of the flexible flap's peripheral edge being associated with the stationary portion of the flexible flap so as to remain stationary during an exhalation, and the free segment of the flexible flap's peripheral edge being associated with the free portion of the flexible flap so as to be movable during an exhalation, the flexible flap having a transverse curvature that is imparted to the flexible flap by the mounting of the flexible flap at the stationary portion, the mounting of the flexible flap at the stationary portion biasing the free portion of the flexible flap toward the seal surface under neutral conditions while also allowing the free portion of the flexible flap to be lifted from the seal surface during an exhalation.

71. The filter face mask of claim 70, wherein the mounting of the flexible flap causes at least a portion of the stationary portion of the flexible flap to reside beneath the seal surface of the valve seat when the valve is viewed from a side elevation.

72. The filter face mask of claim 71, wherein the flexible flap is mounted to the valve by being trapped between respective surfaces on the valve seat and the valve cover.

73. The filter face mask of claim 70, wherein the outlet ports are oriented on the valve cover relative to the flexing of the flexible flap such that exhaled air from a wearer exits the exhalation valve with a downward component that directs the exhalate away from a wearer's eyes.

74. The filter face mask of claim 70, wherein the seal surface has multiple portions that include first and second side portions and a free-end portion, the free segment of the peripheral edge of the flexible flap having a flat configuration above the first and second side portions and the free end portion.

75. The filter face mask of claim 70, wherein the flexible flap's transverse curvature decreases towards an end of the free portion of the flexible flap.

76. The filter face mask of claim 75, wherein the flexible flap lies flat against the seal surface that is disposed beneath the free end of the flexible flap.

77. The filter face mask of claim 70, wherein the valve seat and valve cover are inter-fitting plastic parts.

78. The filter face mask of claim 70, wherein stationary portion of the flexible flap is configured for embracing a member on the valve seat.

REMARKS

Claims 16 to 78 are pending in the application.

By the foregoing Amendment, claims 1-15 are canceled without prejudice or disclaimer. New claims 16 to 78 are added. Attached hereto is listing of the status of all patent claims and all added claims and an explanation of the support in the disclosure of the patent for the changes made to the claims. The attached page is titled "STATUS OF CLAIMS AND SUPPORT FOR CHANGES."

These changes are believed not to introduce new matter, and entry of the Amendment is respectfully requested.

CONCLUSION

The application is now believed to be in condition for examination and allowance. Should any questions arise, the Examiner is invited to call the undersigned representative so that this case may receive an early Notice of Allowance.

Favorable consideration and allowance are earnestly solicited.

Respectfully submitted,

JACOBSON HOLMAN PLLC

Date: 8 November 2001

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STATUS OF CLAIMS AND SUPPORT FOR CHANGES

STATUS OF CLAIMS

Patent claim number(s)	*Status*
1-11	canceled

Added claim number(s)	*Status*
11-15	canceled
16-78	pending

SUPPORT FOR NEW LIMITATIONS IN NEW CLAIMS

Claim(s)	*Limitation*	*Support*
16	An exhalation permitting filter mask assembly for positioning over the mouth and nose of a user	Col. 1, lines 4-9 Figure 1
16	the filter mask assembly comprising a mask configured to fit over the nose and mouth of a user and including filter material through which air can be inhaled by a user while effecting filtration of the inhaled air	Col. 1, lines 4-9 Figure 1
16, 37	a uni-directional valve mounted in the mask for permitting exhalation through the valve while precluding inhalation through the valve	Col. 1, lines 9-15
16, 37	a flexible flap having a root end portion, opposite side portions and a free end portion	Col. 3, lines 16-21
16, 37	an upper housing member	Col. 3, lines 1-6

Claim(s)	*Limitation*	*Support*
16, 31, 37	an inlet port	Col. 3, lines 6-8
16, 37	a valve seat surrounding the inlet port and being part of the upper housing member and including a sealing surface adjacent the inlet port	Col. 3, lines 4-8
16	the flexible flap being fixedly mounted at the root end relative to the upper housing member in a manner so that the free end portion makes sealing contact with the sealing surface when the flexible flap is closed and so that the free end portion of the flexible flap lifts from contact with the portion of the sealing surface and moves outwardly of the sealing surface when exhaled air passes through the inlet port,	Col. 3, lines 16-22, 44-53
16	the flexible flap having a transverse curvature extending medially of the flap imparting sufficient stiffening to the flexible flap to maintain the flexible flap in sealing contact with the sealing surface for any orientation of the filter mask in the absence of a pressure differential across the flexible flap	Col. 3, lines 25-37, 54-61
17, 38	the flexible flap is formed of elastomeric material	Col. 3, lines 2, 12-15
18	the upper housing member includes a curved surface and the transverse curvature is imparted to the flexible flap by virtue of the root end of the flexible flap being held against the curved surface of the upper housing member	Col. 3, lines 25-28
19	a lower housing member facing the upper housing member wherein the root end of the flexible flap is trapped and fixedly positioned between facing surfaces of the upper housing member and the lower housing member	Col. 3, lines 1-4, 16-21
20	the facing surface of the lower housing member is a curved surface	Col. 3, lines 25-28
21	that part of the sealing surface of the valve seat which the free end of the flexible flap contacts is a flat surface.	Col. 3, lines 62-64 Figures 3 and 4

Claim(s)	*Limitation*	*Support*
22	the sealing surface is provided on a portion of a seal ridge surrounding the inlet port	Figures 4 and 5
23	the seal ridge comprises four linear seal ridge members	Col. 3, lines 7-8
23	the facing surface on the lower housing is provided on a profiled block aligned with one of the linear seal ridge members	Col. 3, lines 16-21
24	a second profiled block provided in the lower housing member engaging a central portion of the flexible flap outwardly of the root end to urge the central portion toward the upper housing to enhance the transverse curvature of the flexible flap	Col. 3, lines 29-33
25, 35	the filter material comprises at least one sheet incorporating filter material	Col. 2, lines 53-55
26, 32	a filter mask assembly including a mask body adapted to fit over a nose and a mouth of a wearer	Col. 1, lines 4-9
26, 32	an exhalation valve positioned in an aperture in the mask body and extending through the mask body	Col. 2, lines 64-67
26, 36	the exhalation valve including a flexible flap having a root end portion and a free end portion and a valve seat	Col. 3, lines 2, 12-15 Figure 4
26	the flexible flap being mounted in the valve at its root end portion adjacent the valve seat in a manner that the flexible flap has a free end engaging the valve seat when closed and has a transverse curvature which effects maintenance of the flexible flap in sealing contact with the valve seat for any orientation of the filter mask assembly during usage in the absence of an opening exhalation caused pressure differential across the flap	Col. 3, lines 21-46 Figure 4 and 5
27, 39	the transverse curvature of the flexible flap progressively decreases toward its free end	Col. 3, line 65 to Col. 4, line 4
28	the exhalation valve additionally includes a lower housing member and the root end portion of the flexible flap is caused to contact the valve seat by a portion of the lower housing member	Col. 3, lines 25-37

Claim(s)	*Limitation*	*Support*
29	the exhalation valve is located on the mask in a position so that during normal head movements of a wearer, the free end portion of the flexible flap is generally directed downwardly	Col. 6, lines 10-13
30	the mask body includes at least one sheet of filter material	Col. 2, lines 53-55
31	an exhalation permitting filter mask assembly including a cup-shaped mask body formed of material including filter material and having an inner surface and an outer surface configured to fit over the nose and mouth of a user with the inner surface facing the user to define a breathing space	Col. 1, lines 4-9, col. 2, lines 53-56
31	a one-way valve mounted in the mask body for permitting only exhalation from the breathing space	Col. 1, lines 4-15
31	a first housing	Col. 3, lines 1-6
31	a valve seat in the first housing	Col. 3, lines 4-8
31	a flexible flap engaging the valve seat	Col. 3, lines 12-22
31	the flexible flap has a fixedly positioned root end portion held in fixed position by the housing and a moveable free end	Col. 3, lines 46-53
31	the valve seat has a curved sealing surface that contacts the flap at the root end and an outer sealing surface engaged by the free end of the flexible flap to preclude inhalation through the one-way valve	Col. 3, line 62 to Col. 4, line 8
31	a second housing including a profiled block having a curved surface which mates with the curved sealing surface of the valve seat and contacts the flexible flap at its root end so that the root end is clamped between the curved surface of the profiled block and the curved sealing surface of the valve seat to impart transverse curvature to the flexible flap at the root end	Col. 3, lines 1-2, 16-21, 25-29
31	the transverse curvature causes the free end of the flexible flap to be pressed into contact with the outer sealing surface in the absence of an opening exhalation pressure differential across the flap	Co. 3, lines 44-61

Claim(s)	*Limitation*	*Support*
31	when an opening exhalation pressure differential is created across the flap, the free end of the flexible flap flexes away from the outer sealing surfaces to permit exhalation through the valve	Col. 4, lines 2-7
32	one of the housings includes lateral protrusions which extend into the other of the housings for effecting proper alignment of the first and second housings	Col. 3, lines 8-12
33	one of the housings includes openings each matingly receiving a portion of one of the lateral protrusions of the other of the housings	Col. 3, lines 8-12
34	the flexible flap includes a notch in an edge and one of the housings includes a positioning block extending into the notch for effecting proper positioning of the flexible flap	Col. 3, lines 16-17
36	the flexible flap being mounted in the valve inwardly of the rearmost extent of its root end portion adjacent the valve seat	Figure 4
36	the flexible flap has a transverse curvature which effects maintenance of the flexible flap in sealing contact with the valve seat for any orientation of the filter mask assembly in the absence of an opening exhalation caused pressure differential across the flexible flap.	Col. 3, Lines 21-37 Figures 4 and 5
37	the flexible flap being fixedly mounted at the root end portion relative to the upper housing member in a manner so that the flexible flap makes contact with the sealing surface when the flexible flap is closed and so that the free end portion of the flexible flap lifts from contact with the sealing surface and moves outwardly of the sealing surface in response to exhalation by the user so that exhaled air passes through the inlet port	Col. 3, lines 16-22, 44-53

Claim(s)	*Limitation*	*Support*
37	the flexible flap having a transverse curvature extending outwardly from the root end portion imparting sufficient stiffening to the flexible flap to maintain the flexible flap in sealing contact with the sealing surface for any orientation of the filter mask in the absence of an exhalation pressure differential across the flexible flap	Col. 3, lines 25-37, 54-61
40	an exhalation permitting filter mask assembly including a mask body formed of material including filter material	Col. 1, lines 4-9, Col. 2, lines 53-56 Figure 1
40	the mask body having an inner surface and an outer surface and being configured to fit over the nose and mouth of a user with the inner surface facing the user to define a breathing space	Col. 2, lines 53-56 Figure 1
40	the flexible flap has a longitudinal axis and a fixedly positioned root end portion held in fixed position relative to the upper housing and the lower housing and a moveable free end portion	Col. 3, lines 1-10, 20-27 Figure 4
40	the flexible flap is fixedly positioned so that its root end portion engages the seal ridge and the lower housing in a manner imparting transverse curvature to the flexible flap at the root end portion, and so that the transverse curvature causes the free end of the flexible flap to be pressed into contact with the seal ridge in any orientation of the valve in the absence of an opening exhalation pressure differential across the flap	Col. 3, lines 44-53 Figures 4 and 5
40	when an opening exhalation pressure differential is created across the flexible flap, the free end portion of the flexible flap flexes away from the real ridge allowing exhalation through the valve.	Col. 3, lines 44-53
40	a one-way valve mounted in the mask body for permitting only exhalation from the breathing space and including an upper housing and a lower housing, a seal ridge defining a valve seat and at least one inlet port in the upper housing surrounded by the seal ridge	Col. 2, lines 64-67, Col. 3, lines 1-10

Claim(s)	*Limitation*	*Support*
40	a flexible flap positioned between the upper housing and the lower housing to contact the seal ridge and preclude inhalation through at least one inlet port engaging the valve seat	Col. 3, lines 16-61
41	a mask body adapted to fit over a nose and a mouth of a wearer	Col. 1, lines 1-4 Figure 1
41	an exhalation valve mounted to the mask body	Col. 2, lines 64-67
41	the exhalation valve comprising a flexible flap and a valve seat	Col. 3, lines 13-15
41	the flexible flap being mounted to the valve seat in cantilever fashion for movement between open and closed positions	Col. 3, lines 21-53
41	the flexible flap having a longitudinal dimension and a free end that rests upon the valve seat when in closed position	Col. 3, lines 44-46
41	the flexible flap also having a transverse curvature in a direction transverse to the flap's longitudinal dimension	Col. 3, lines 25-29
41	the transverse curvature biasing the flexible flap to effect positioning and retention of the flexible flap in the closed position in the absence of an opening pressure differential across the flap for any orientation of the valve	Col. 3, lines 34-37
42	the flexible flap has maximum transverse curvature at the the location where the flexible flap is mounted to the valve seat	Col. 4, lines 2-8 Figures 4 and 5
43	the transverse curvature of the flexible flap progressively decreases toward the free end of the flexible flap	Col. 4, lines 2-8 Figure 4
44	the transverse curvature is imparted to the flexible flap by virtue of its mounting to the valve seat	Col. 3, lines 25-29 Figures 4 and 5
45	the flexible flap is mounted to the valve seat by being pressed towards the seat by a member disposed on a valve cover	Col. 3, lines 25-29

Claim(s)	*Limitation*	*Support*
46	the exhalation valve is so located on the mask such that during normal head movements of a wearer, the free end of the flexible flap is generally directed downwardly	Col. 3, lines 22-25 Figure 1
47	a mask body adapted to fit over a nose and mouth of a wearer for filtering inhalation air	Col. 3, lines 22-25 Figure 1
47	an exhalation valve mounted to the mask body, the exhalation valve including a flexible flap	Col. 2, lines 64-65
47	an upper housing including a seal ridge terminating in a seal surface	Col. 3, lines 4-8
47	a lower housing	Col. 3, lines 8-10
47	the upper housing including one or more inlet ports, the one or more inlet ports being surrounded by the seal ridge	Col. 3, lines 4-8
47	the lower housing including one or more outlet ports and being joined to the upper housing	Col. 3, lines 8-12
47	the flexible flap having a stationary portion and a free portion and a peripheral edge that includes both stationary and free segments	Col. 3, lines 16-37 Figures 4 and 5
47	the stationary portion of the flexible flap being held in a fixed position relative to and in contact with a portion of the seal ridge so as to remain stationary during exhalation, and the free portion of the flexible flap being movable during exhalation	Col. 3, lines 16-20, 46-53 Figures 4 and 5
47	the flexible flap having a transverse curvature that is imparted to the flexible flap by the mounting of the flexible flap in contact with a portion of the seal ridge; the transverse curvature effecting biasing of the free portion of the flexible flap towards the seal surface under neutral conditions while also allowing the free portion of the flexible flap to be lifted from the seal surface during an exhalation	Col. 3, lines 25-53 Figures 4 and 5

Claim(s)	*Limitation*	*Support*
48	the mounting of the flexible flap causes at least a portion of the stationary portion of the flexible flap to reside beneath the seal surface means of the valve seat when the valve is viewed from a side elevation	Col. 3, lines 25-53 Figures 4 and 5
49	the flexible flap is mounted in cantilever manner to the valve by being trapped between respective surfaces on the valve seat and the valve cover	Col. 3, lines 16-21 Figures 4 and 5
50	the outlet ports are oriented on the valve cover relative to the flexing of the flexible flap such that exhaled air from a wearer exits the exhalation valve with a downward component that directs the exhalate away from a wearer's eyes	Col. 3, lines 37-43
51	the seal surface has multiple portions that include first and second side portions and a free-end portion, the free segment of the peripheral edge of the flexible flap having a flat configuration above the first and second side portions and the free end portion	Col. 3, lines 4-8 Figures 2 and 3
52	the flexible flap's transverse curvature progressively decreases towards an outer end of the free portion of the flexible flap	Col. 4, lines 2-8 Figures 4
53	the valve seat and valve cover are inter-fitting plastic parts	Col. 3, lines 1 and 2
54	said stationary portion of the flexible flap is permanently configured for embracing a portion of the valve seat	Col. 3, lines 16 and 17 Figure 2
55	a flexible flap	Col. 3, lines 1-3
55	a cooperating valve seat, the valve seat including a seal surface that surrounds an orifice, the flexible flap being attached to the valve seat in a cantilevered fashion such that the flexible flap makes contact with the seal surface when the flexible flap is closed and such that a free end of the flexible flap lifts from the seal surface when fluid passes through the orifice in the permitted direction	Col. 3, lines 4-8, 16-22 and 44-53 Figures 3 and 4

Claim(s)	*Limitation*	*Support*
55	the flexible flap having a transverse curvature to bias the flexible flap to the seal surface in the absence of a pressure differential across the flexible flap, under any orientation of the valve	Col. 3, lines 25-37 and 54-61
56	the flexible flap exhibits the curvature in its natural state	Col. 2, lines 25-27
57, 67	the curvature is imparted to the flexible flap by virtue of its mounting to the valve seat	Col. 3, lines 16-34 Figures 4 and 5
58	the flexible flap is trapped at a fixed portion of the flexible flap between confronting surfaces of the valve seat and a valve cover	Col. 3, lines 16-28 Figures 4 and 5
59	the confronting surfaces are curved	Col. 3, lines 25-28 Figure 5
60	that part of the seal surface which the free end of the flexible flap is adapted to contact is flat	Col. 3, line 63 Figures 3 and 4
61	the flexible flap includes side edges adapted to contact the seal surface and wherein those parts of the seal surface which the side edges of the flexible flap are adapted to contact are flat	Col. 3, lines 12-13 Figures 3 and 4
62	the mounting of the flexible flap on the valve seat also imparts a longitudinal curvature to the central section of the flexible flap	Figure 4
63	A filter mask that has an exhalation valve, constructed in accordance with claim 51 mounted to the mask	Figure 1
64, 70	a mask body adapted to fit over a nose and a mouth of a wearer	Figure 1
64, 70	an exhalation valve mounted to the mask body	Figure 1

Claim(s)	*Limitation*	*Support*
64	the exhalation valve comprising a flexible flap and a valve seat, the flexible flap being mounted to the valve seat in cantilever fashion such that it has a longitudinal dimension, the flexible flap having a free end that rests upon the valve seat when closed, the flexible flap exhibits a curvature in a direction transverse to the flexible flap's longitudinal dimension, the transverse curvature biasing the flexible flap to assist in closing the valve in the absence of an opening pressure differential across the flexible flap, under any orientation of the valve	Col. 3, lines 34-37 Figure 4 and 5
65	the flexible flap has a transverse curvature at the location where the flexible flap is mounted to the valve seat	Col. 3, lines 16-34
66	the transverse curvature of the flexible flap decreases in the longitudinal dimension toward a free end of the flexible flap	Col. 4, lines 2-5 Figure 4
68	the flexible flap is mounted to the valve seat by being pressed toward the valve seat by a member disposed on a valve cover	Col. 3, lines 16-19 Figure 4 and 5
69	the exhalation valve is so located on the mask such that during normal head movements of a wearer, the free end of the flexible flap is generally directed downward	Col. 3, lines 37-43 Figure 4
70	an exhalation valve mounted to the mask body	Col. 2, lines 64-67

Claim(s)	*Limitation*	*Support*
70	the exhalation valve comprising a flexible flap, a valve seat, and a valve cover, the valve seat comprising one or more inlet ports, which one or more ports are surrounded by a seal surface, the valve cover comprising one or more outlet ports and being joined to the valve seat, the flexible flap having a stationary portion and a free portion and a peripheral edge that includes stationary and free segments, the stationary segment of the flexible flap's peripheral edge being associated with the stationary portion of the flexible flap so as to remain stationary during an exhalation, and the free segment of the flexible flap's peripheral edge being associated with the free portion of the flexible flap so as to be movable during an exhalation, the flexible flap having a transverse curvature that is imparted to the flexible flap by the mounting of the flexible flap at the stationary portion, the mounting of the flexible flap at the stationary portion biasing the free portion of the flexible flap toward the seal surface under neutral conditions while also allowing the free portion of the flexible flap to be lifted from the seal surface during an exhalation	Col. 3, lines 1-12, 16-61 Figures 4 and 5
71	the mounting of the flexible flap causes at least a portion of the stationary portion of the flexible flap to reside beneath the seal surface of the valve seat when the valve is viewed from a side elevation	Col. 3, lines 16-28 Figure 4
72	the flexible flap is mounted to the valve by being trapped between respective surfaces on the valve seat and the valve cover	Col. 3, lines 16-28 Figure 4
73	the outlet ports are oriented on the valve cover relative to the flexing of the flexible flap such that exhaled air from a wearer exits the exhalation valve with a downward component that directs the exhalate away from a wearer's eyes	Col. 3, lines 37-43
74	the seal surface has multiple portions that include first and second side portions and a free-end portion, the free segment of the peripheral edge of the flexible flap having a flat configuration above the first and second side portions and the free end portion	Col. 3, lines 7-8, 16-20 Figures 2, 3 and 4

Claim(s)	***Limitation***	***Support***
75	the flexible flap's transverse curvature decreases towards an end of the free portion of the flexible flap	Col. 4, lines 2-5 Figure 4
76	the flexible flap lies flat against the seal surface that is disposed beneath the free end of the flexible flap	Col. 3, lines 34-37 Figure 4
77	the valve seat and valve cover are inter-fitting plastic parts	Col. 3, lines 1-2 Figure 4
78	stationary portion of the flexible flap is configured for embracing a member on the valve seat	Col. 3, lines 25-29 Figures 4 and 5

PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of:	
John L. BOWERS	
Application No. 09/442,082	Art Unit: 3753
Filed: November 15, 1999	Examiner: J. Kim
For: UNI-DIRECTIONAL FLUID VALVE	Atty Docket: 19462.125
	New Atty Docket: P64258US1

<u>RESPONSE AND AMENDMENT</u>

Assistant Commissioner for Patents
Washington, D.C. 20231

Sir:

In response to the Office Action dated May 30, 2000 (PTO Prosecution File Wrapper Paper No. 5), Applicant submits the following Amendment and Remarks.

It is not believed that extensions of time or fees for net addition of claims are required, beyond those that may otherwise be provided for in documents accompanying this paper. However, in the event that additional extensions of time are necessary, then such extensions of time are hereby petitioned under 37 CFR § 1.136(a); and any fees required for consideration of this paper and any papers associated with it (including fees for net addition of claims) are hereby authorized to be charged to our Deposit Account No. 06-1358.

Kindly enter the following Amendment:

ATTORNEY DOCKET NUMBER

Please change the Attorney Docket Number to --P64258US1--.

IN THE CLAIMS

Please amend the claims as follows:

1. (Amended) A uni-directional fluid valve comprising a cantilevered flexible flap and a cooperating valve seat surrounding a valve orifice; the cantilevered flexible flap having a planform defining a root end and a free end at opposite ends of a longitudinal axis of the flap, and two peripheral side edges respectively extending between the root end and the free end; the valve seat having sealing surfaces that contact the flap along said root end, free end and peripheral side edges when the fluid valve is closed; the cantilevered flexible flap is mounted [between] in contact with the respective sealing surface of the valve seat at said root end and is freely movable to flex away from the respective sealing surfaces of the valve seat at said free end and along at least portions of said peripheral side edges when fluid flows through the fluid valve and the fluid valve is open; and said root end of the cantilevered flexible flap and the respective sealing surface that contacts the cantilevered flexible flap at said root end have a fixed curvature in a direction transverse to said longitudinal axis, said transverse curvature biases the flap and maintains it substantially in contact with all said

sealing surfaces of the valve seat in the absence of an opening pressure differential across the flap, in any orientation of the valve.

10. (Amended) A filter mask having an exhalation valve comprising a cantilevered flexible flap and a cooperating valve seat surrounding a valve orifice; the cantilevered flexible flap having a planform defining a root end and a free end at opposite ends of a longitudinal axis of the cantilevered flexible flap, and two peripheral side edges respectively extending between the root end and the free end; the valve seat having sealing surfaces that contact the cantilevered flexible flap along said root end, free end and peripheral side edges when the exhalation valve is closed; the cantilevered flexible flap is mounted [between] <u>in contact with</u> the respective sealing surface of the valve seat at said root end and is freely movable to flex away from the respective sealing surfaces of the valve seat at said free end and along at least portions of said peripheral side edges when a user of the filter mask exhales and causes the exhalation valve to open: and said root end of the cantilevered flexible flap and the respective sealing surface that contacts the cantilevered flexible flap at said root end have a fixed curvature in a direction transverse to said longitudinal axis, said transverse curvature biases the flap and maintains it substantially in contact with all said sealing surfaces of the valve seat in the absence of an exhalatory pressure differential across the flap, in any orientation of the valve.

12. (Amended) A uni-directional fluid valve comprising:

a cantilevered flexible flap and a cooperating valve seat surrounding a valve orifice;

the cantilevered flexible flap having a planform defining a root end and a free end at opposite ends of a longitudinal axis of the flap;

the valve seat having sealing surfaces that contact the flap at said root end and the free end when the fluid valve is closed;

the cantilevered flexible flap being mounted [between] <u>in contact with</u> the respective sealing surface of the valve seat at said root end and being freely movable to flex away from the respective sealing surface of the valve seat at said free end when fluid flows through the fluid valve and the fluid valve is open; and

said root end of the cantilevered flexible flap and the respective sealing surface that contacts the cantilevered flexible flap at said root end having a transverse configuration extending in a direction transverse to said longitudinal axis, said transverse configuration resulting in maintaining the flap substantially in contact with said sealing surfaces of the valve seat in the absence of an opening pressure differential across the flap, in any orientation of the valve.

13. (Amended) A uni-directional fluid valve comprising:

a cantilevered flexible flap and a cooperating valve seat surrounding a valve orifice;

the cantilevered flexible flap having a planform defining a root end and a free end at opposite ends of a longitudinal axis of the flap, and two peripheral side edges respectively extending between the root end and the free end;

the valve seat having sealing surfaces that contact the flap at said root end, said free end, and said peripheral side edges when the fluid valve is closed;

the cantilevered flexible flap being mounted [between] <u>in contact with</u> the respective sealing surface of the valve seat at said root end and being freely movable to flex away from the respective sealing surface of the valve seat at said free end and along at least portions of said peripheral side edges when fluid flows through the fluid valve and the fluid valve is open; and

said root end of the cantilevered flexible flap and the respective sealing surface that contacts the cantilevered flexible flap at said root end having a transverse configuration extending in a direction transverse to said longitudinal axis, said transverse configuration resulting in maintaining the flap substantially in contact with said sealing surfaces of the valve seat in the absence of an opening pressure differential across the flap, in any orientation of the valve.

14. (Amended) A filter mask having an exhalation valve comprising:

a cantilevered flexible flap and a cooperating valve seat surrounding a valve orifice;

the cantilevered flexible flap having a planform defining a root end and a free end at opposite ends of a longitudinal axis of the cantilevered flexible flap;

the valve seat having sealing surfaces that contact the cantilevered flexible flap along said root end and said free end when the exhalation valve is closed;

the cantilevered flexible flap being mounted [between] <u>in contact with</u> the respective sealing surface of the valve seat at said root end and being freely movable to flex away from the respective sealing surface of the valve seat at said free end when a user of the filter mask exhales and causes the exhalation valve to open and wherein said root end of the cantilevered flexible flap and the respective sealing surface that contacts the cantilevered flexible flap at said root end have a transverse configuration extending in a direction transverse to said longitudinal axis so that the flap is substantially maintained in contact with all of said sealing surfaces of the valve seat in the absence of an exhalatory pressure differential across the flap, in any orientation of the valve.

15. (Amended) A filter mask having an exhalation valve comprising:

a cantilevered flexible flap and a cooperating valve seat surrounding a valve orifice;

the cantilevered flexible flap having a planform defining a root end and a free end at opposite ends of a longitudinal axis of the cantilevered flexible flap, and two peripheral side edges respectively extending between the root end and the free end;

the valve seat having sealing surfaces that contact the cantilevered flexible flap along said root end, free end and peripheral side edges when the exhalation valve is closed;

the cantilevered flexible flap being mounted [between] in contact with the respective sealing surface of the valve seat at said root end and being freely movable to flex away from the respective sealing surfaces of the valve seat at said free end and along at least portions of said peripheral side edges when a user of the filter mask exhales and causes the exhalation valve to open and wherein said root end of the cantilevered flexible flap and the respective sealing surface that contacts the cantilevered flexible flap at said root end have a transverse configuration extending in a direction transverse to said longitudinal axis so that the flap is substantially maintained in contact with all of said sealing surfaces of the valve seat in the absence of an exhalatory pressure differential across the flap, in any orientation of the valve.

REMARKS

Claims 1-15 are pending in the application.

By the foregoing Amendment, claims 1, 10, 12, 13, 14, and 15 are amended to change "mounted between" to "mounted in contact with". This amendment is believed necessary as

"between" is believed to render the claims indefinite, as the limitation "the cantilevered flexible flap is mounted between the respective sealing surface" does not specify a second element between which the flap is mounted. Support for the amendment to the claims is found at column 3, lines 16-21 ("The flap 7 is positioned in the valve by a notch 13 at one end embracing a block 14 on housing member 5, and when the housing members are snapped together that end of the flap becomes trapped between the adjacent portion 9A of the seal ridge and a profiled block 15 upstanding from housing member 6.") and column 3, lines 44-53 ("In use, therefore, the flap 7 seats upon the seal ridge to prevent the passage of any air into the mask through the valve 4 while the user is not exhaling. At the commencement of exhalation, as soon as a minimum 'cracking' pressure differential is applied to the flap 7 from the interior of the mask the free end of the flap will lift away from the seal ridge in the sense of the arrow X in FIG. 4, and flexure of the flap will progress rapidly along its length towards the fixed (root) end, to a position determined by the instantaneous rate of flow of exhalate out through ports 8 and 10."). These changes are believed not to affect the allowability of the claims or introduce new matter, and entry of the Amendment is respectfully requested.

A Supplemental Reissue Declaration accompanies this Response.

In response to the requirement that the original patent be surrendered, the original patent is also submitted herewith.

Acknowledgment of Supplemental Information Disclosure Statement

A Supplemental Information Disclosure Statement was mailed on July 17, 2000 for the Examiner's consideration. If the Supplemental Information Disclosure Statement has not been

matched with the PTO's application file, the Examiner is requested to call the undersigned counsel so that another copy can be provided. If the Supplemental Information Disclosure Statement has been matched with the PTO file, it is requested that the Examiner initial the space adjacent each document entry on the accompanying Form PTO-1449, and return a copy of the initialed Form PTO-1449 to confirm that the documents have been considered and have been officially made of record in this application.

Request to Verify Change of Address

A "Notice of Change of Address" has been filed in this application to direct the PTO to send correspondence to the correspondence address associated with Customer No. 000,136, which is the address set forth in the signature block below. If the Notice has not been matched with the PTO's application file, the Examiner is requested to call the undersigned counsel so that another copy can be provided. If the Notice has been matched with the PTO file, it is requested that the Examiner verify that the information has been entered into the PTO mailing system so that future communications will be mailed to the correct address.

Conclusion

All requirements have been complied with, properly traversed, or rendered moot. Thus, it now appears that the application is in condition for allowance. Should any questions arise. the Examiner is invited to call the undersigned representative so that this case may receive an early Notice of Allowance.

Favorable consideration and allowance are earnestly solicited.

Respectfully submitted,

JACOBSON, PRICE, HOLMAN & STERN, PLLC

Date: Aug. 30, 2000

By: _____

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